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Gas Journal

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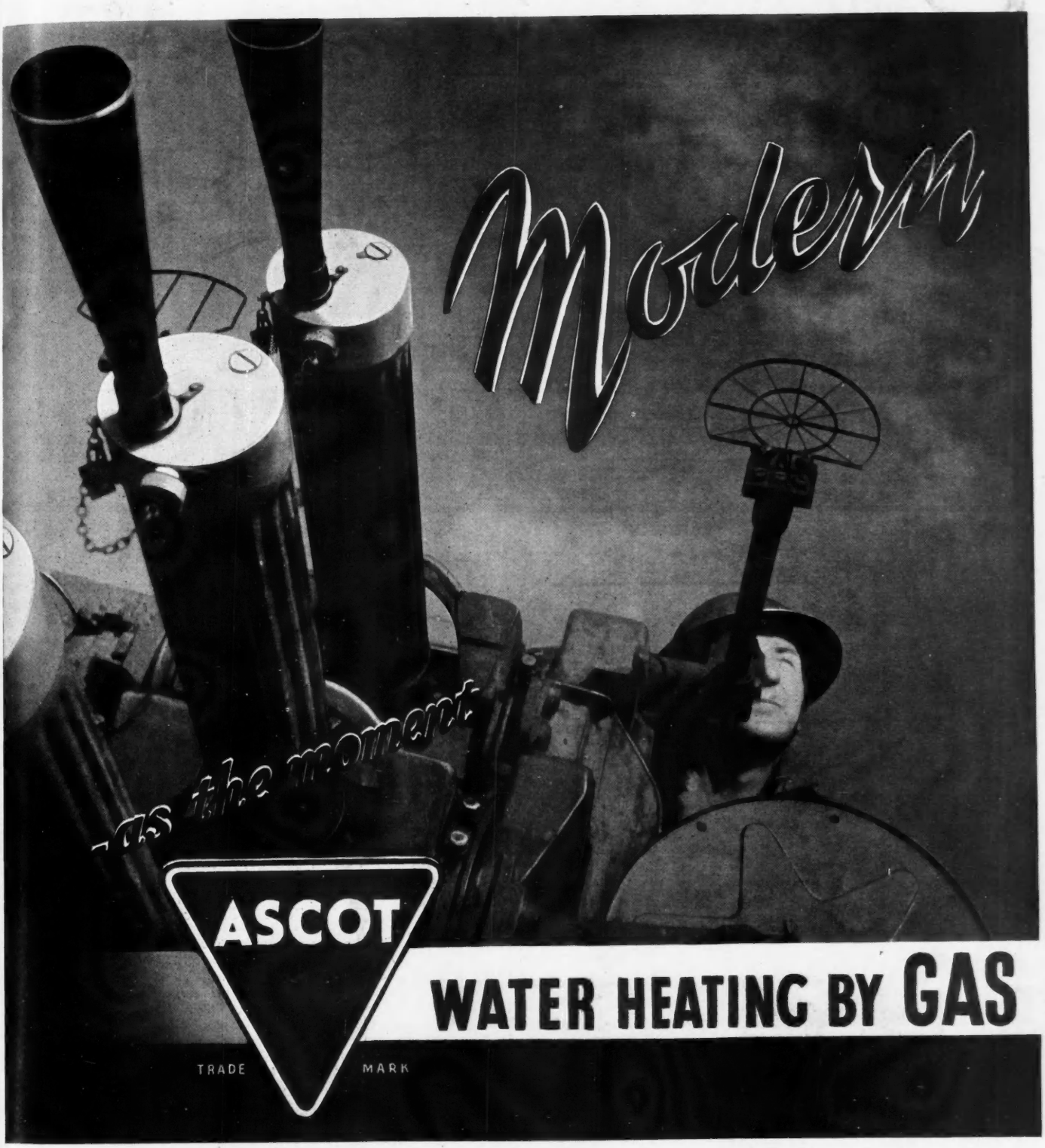
Vol. 236. 93rd Year. LONDON, DECEMBER 10, 1941. Registered as a Newspaper No. 4099. Price 1/-



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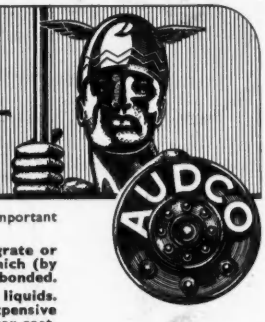

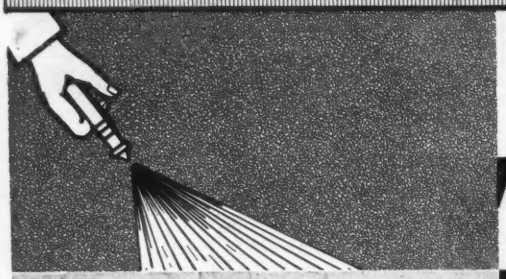

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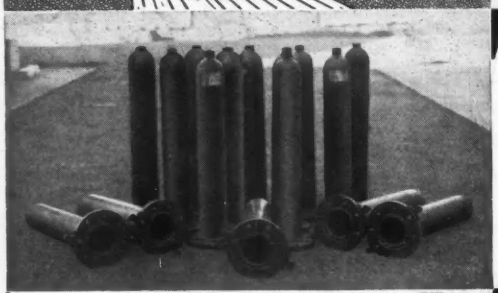

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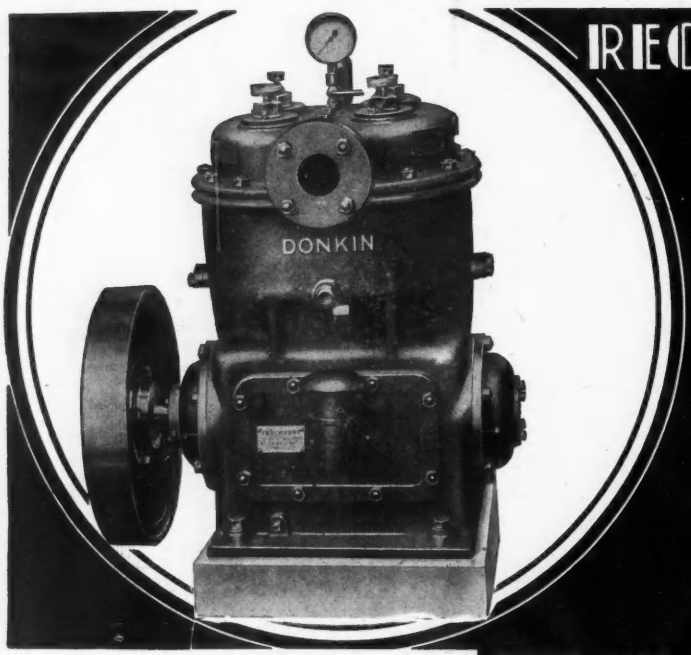

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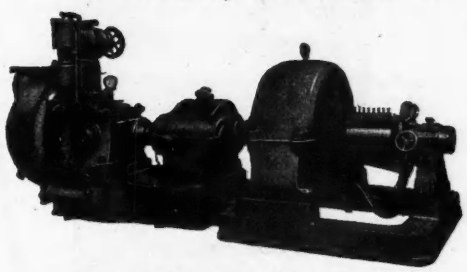

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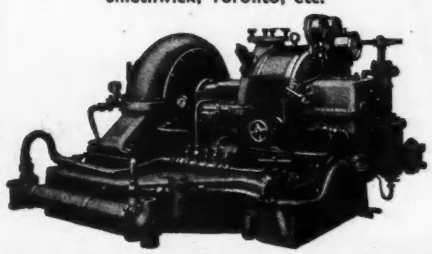

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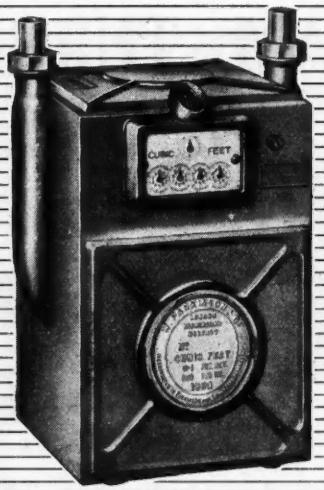

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THE SOCIETY OF BRITISH GAS INDUSTRIES · 1905

GAS JOURNAL, DEC. 10, 1941

VOL. 236 93rd YEAR No. 4099

EDITORIAL NOTES

DOMESTIC WATER HEATING

IT is becoming generally recognized that purely commercial competition between different fuels is destined, in the post-war era for which plans are already being made, to give way to a national policy in which each shall play the part for which it is best fitted, and in which it is able to give the best service to the people. The demand for a higher standard of living all round which will undoubtedly be a feature of post-war reconstruction can only be satisfied by an impoverished country provided truly economic use is made of all available resources. A small point, but one which concerns us very closely, affecting the standard of living will be the desire for a much greater supply of domestic hot water than has been available in the past, and we were particularly pleased to publish last week Mr. Leopold Friedman's admirable treatise on the subject which collated so many relevant figures and discussed so many aspects of the subject.

The fact that there is a wartime "understanding" between the gas and electricity industries must on no account preclude consideration to-day of broad issues affecting the future and, taking a long view, those who have the shaping of fuel policy will have to decide which form of energy is the better suited for specific purposes. Mr. Friedman's treatise has given us the cue to discuss hot water for the million. We dealt with one aspect of it last week, and now we propose to consider the place of electricity in the general scheme which will have to be evolved. We have every reason to believe that the electricity industry will welcome dispassionate discussion of such points, and that it is no less determined than our own to place itself at the nation's service in whatever manner it best can serve. Moreover, as we presently shall show, with the elimination of competition imposed by war conditions there are evident signs of recognition in electricity circles that the old ways were bad ways, and that uncontrolled development of the domestic load at prices as low as a halfpenny a unit could not have continued indefinitely.

This being Mr. Friedman's basic figure for water heating by electricity, let us examine what to our mind are the two major points covering the problem as a whole: (1) Which refined form of heating energy is it better to employ for the purpose from the angle of national interest? (2) From which form of energy can the vast majority of the community expect to gain the better, more flexible, more economical heating service? Effective planning cannot be put in hand if these two considerations do not form the basis. Solid fuel—and, thinking of the future, smokeless solid fuel in particular—enters into the picture. For the moment, however, we will confine our remarks to gas and electricity.

No one would deny that electricity is the one form of energy for certain specific and essential services, that in these spheres it brooks no competition. But when it comes to domestic heating services for the mass of our population—these services including room warming and cooking and also water heating—the position is very different. For the production of electricity from coal it is for certain purposes quite proper to sacrifice a good deal (about 80%) of the coal's original potential thermal content. Compared with gas production as at present practised, the sacrifice involves not only heat but valuable chemical derivatives from coal. This is surely a cardinal point, and from the aspect of thermodynamics and long-range fuel economy it seems wrong to encourage the use of electricity for domestic heating purposes. At a cost of three-quarters or more of the total, the chemical energy of coal is converted into electricity; it is surely a mistake, unless there are special considerations which override those of thermal economy, to use this electrical energy in the degraded form of low temperature heat. Nearly four years ago Mr. E. V. Evans, in a lecture to the Royal Society of Arts, asked whether it would be a defensible proposition to burn coal for the production of steam, to supply the steam to an engine, to cause the engine to turn a shaft, and then to apply a brake block to the shaft so that the friction between the block and the shaft might generate sufficient heat to warm one's home or office. Yet that in effect is what is done when the energy of coal is converted into electrical energy which is then used for heating purposes.

We come to the second point: From which form of energy, gas or electricity, can the vast majority of the community expect to gain the more economical and flexible service? Here we must bear in mind the purchasing power of the public, the majority of whom cannot afford a luxury fuel at luxury prices. In the electrical industry, water heating is bound up to a greater extent with cooking and warming—with the domestic load in general—than is the case in the gas industry. For some time the electricity industry has expressed anxiety concerning the incidence of a developing domestic heating load on the costs and, indeed, the possibilities of supply; and lately control of the domestic load in the future has been under discussion. The load factor enters largely into the economics of supplying electricity for cooking, heating, and water heating on the basis of a fixed charge and current at a figure of something like 0.5d. a unit. As a result of experience already gained, strong arguments are being advanced in electrical circles concerning the dangers of pushing the domestic use of electricity indiscriminately. Load control is being advocated, as also is the encouragement of the use of coal for heating and for cooking and water heating in the dark and cold season. It is, we think, generally admitted in the electrical industry that, on principle, water heating should be on a thermal storage basis—again under strict control. This is the reverse of the widespread use, at will, of an instantaneous gas-heated hot water supply as envisaged by Mr. Friedman in his contribution published in last week's "JOURNAL." Fundamentally gas has an enormous advantage over electricity in that it can liberate large quantities of heat immediately in small space; the consumer is assured of a flexible supply of hot water at any time "on tap." The value of such gas service does not need stressing.

It seems certain that the policy of selling electricity at prices as low as 0.5d. per unit for domestic heating, including water heating, cannot be encouraged. Significant of such second thoughts was a recent Paper to the Institute of Electrical Engineers, in which Mr. P. Schiller suggested that in future an electricity supply undertaking should offer to domestic consumers a flat rate tariff and a two-part controlled-demand tariff on the following lines: Fixed charge (up to £30 rateable value, £3 a year; above £30, 10% of the value) and running charge 0.5d. a unit, and then for each £1 of fixed charge the undertaking would provide a service of 2 kW. If a higher service was desired, a charge would be added to the annual fixed charge at a rate of £1 for each additional 2 kW. service rating. In other words, the consumer could not have unrestricted service at low cost; his wishes, the times when he can have hot water or even an electric radiator, must be controlled for him by the supply undertaking. The planners of the future could hardly regard this as a high form of service; nor do we think that the average consumer would submit to the inconvenience of controlled electricity if gas and the service it affords could economically be "on tap." And Mr. Friedman's figures, which are open to the whole world to argue about, are at the moment the last word on the subject. We would ask the planners to study them very closely.

PEAT FOR H_2S REMOVAL

IN our issue of July 23 we published a letter from Messrs. Applebey and Hughes, of Imperial Chemical Industries, Ltd., concerning the use of peat as a substitute for oxide for the removal of hydrogen sulphide from gas. Reference was made to experiments undertaken by I.C.I. which indicated that the requirements of iron oxide might be substantially reduced by making use of bacterial action. It was stated that the amount of peat mixed with oxide could be "raised to very high proportions with no diminution in efficiency." At the time a detailed account of the work was promised, and this account was forthcoming at a joint meeting of the Society of Chemical Industry and the Northern Section of the Coke Oven Managers' Association on Nov. 27, when Dr. R. Quarendon gave a Paper describing the investigation and its results. Now that supplies of Dutch bog ore can no longer be obtained, a cheap and readily available material to supplement burnt spent oxide and other oxides produced in this country is obviously of great interest and importance, and the I.C.I. research conducted at Billingham during the past three years has elucidated what happens when hydrogen sulphide comes into contact with peat. Under suitable conditions, peat functions as an active purification material by virtue of its sulphur bacteria, which oxidize hydrogen sulphide to sulphur; and these conditions, stated Dr. Quarendon, "are easily realized and controlled and involve no radical change in the working of the oxide boxes." It is with these "suitable conditions" that we are primarily concerned in this note.

The Paper was entitled "Bacterial Removal of Hydrogen Sulphide from Water Gas and Coal Gas by Peat and Peat-oxide Mixtures," and it was stated that the only essential modification of current oxide box practice necessary is the addition to the gas of 0.03 to 0.05% of ammonia to bring the bacteria into an active condition. The statement was made in a short summary preceding the Paper proper, and it should, we think, be made clear that this refers to the purification of water gas. We ought to add, however, that at the end of the Paper the following statement is made: "0.04–0.06% of ammonia is generally necessary in water gas to bring the bacteria into an active condition; 0.04% suffices to maintain maximum hydrogen sulphide removal." The difference between purifying coal gas for town use and purifying water gas should be emphasized, for it would be most unfortunate if the excellent work of I.C.I. in this direction was applied to gas-works practice without due regard to this difference and the " suitable conditions " involved, without due regard to the far greater content of hydrogen sulphide in coal gas than that present in water gas.

Dr. Quarendon related that through the offices of the High Temperature Carbonization Committee of the Ministry of Mines it was arranged for peat and peat-oxide mixtures to be tested in oxide boxes at a works of the Gas Light and Coke Company under the supervision of Dr. Hollings, and it is with the results of these tests that we are particularly concerned. First, in regard to the test on peat fines alone, the ammonia concentration in the gas entering the box was allowed to rise to 0.2–0.4%, and averaged 83 grains per 100 cu.ft. In a sense the test was unsuccessful. Although good at first, the activity of the mass soon fell away. The test did, however, substantiate the main claim as to the action of peat alone. Dr. Quarendon suggested that, in view of later experiments at Billingham, the concentration of ammonia used was unnecessarily high. Secondly, in regard to the peat-oxide test, the mixture used being one of equal volumes of partly-spent oxide and of peat fines, in this case an average of 0.08% of ammonia was used—25 grains per 100 cu.ft. Here we have the Author's statement that, should the activity of the mass diminish, "it could possibly be improved by increasing the ammonia concentration,"—that is, above 25 grains per 100 cu.ft.

From a gas-works point of view this question of ammonia concentration is very important. Preliminary tests on the substitution of ammonium sulphate, diammonium hydrogen phosphate, ammonium nitrate, and urea for gaseous ammonia have been made, but in every case the hydrogen sulphide removed by peat was negligible. So far, then, no effective alternative to the use of ammonia has been found. With the use of ammonia in the amounts needed for the purification of coal gas for town distribution the peat or peat-oxide mass accumulates ammonium thiocyanate, and one must consider the corrosive effect of thie substance in relation to the life of purifiers, and its possibls effect, too, on the revenue from the sale of the spent material to the manufacturers of sulphuric acid. One must consider, too, the possible effects of ammonia slip to the purified gas on distribution and utilization costs; we will not elaborate them here. But we would like to call attention to the view expressed by Dr. Hollings at the meeting at which Dr. Quarendon's Paper was presented—that the admission of 25 grains of ammonia per 100 cu.ft. of gas to purifiers is too high for gas-works practice. He definitely does not recommend such a high slip of ammonia.

We have said, and we reiterate, that we regard the work of Imperial Chemical Industries on the use of peat and peat-oxide mixtures for the removal of hydrogen sulphide from gas as being of great importance. We feel that it will prove highly useful to the Gas Industry and that the Industry will not neglect its implications and possibilities; we set out these few thoughts on Dr. Quarendon's Paper in no parsimonious mood, but rather to focus attention on the "suitable conditions" for the use of peat for the purpose, with particular emphasis on the ammonia content needed for the effective operation of the material. We think that Dr. Hollings was very much to the point in expressing at the meeting the view that in future work on the subject should not be to increase the ammonia content of the gas to suit some preconceived proportion of peat, but that we should take the gas as it is with its low ammonia content and should adjust the peat content of the mixture to give the best performance. In such a way a helpful contribution might well be made —and without any objection—to the conservation of iron oxide. As to the best proportion of peat, this may prove to be between 10% and 50% by volume in the mixture.

BENZOLE RECOVERY

PRIOR to and since September of 1939 we have discussed the question of benzole recovery at gas-works on very many occasions and have emphasized that small works can generally and without undue difficulty add their quota to the extraction pool. Our last reference to the subject was in our issue of Nov. 12, our comments being concerned with the General Direction for compulsory benzole recovery. Early in the war too much discussion at meetings of gas engineers centred on the economics of the process, but the necessity for extraction became apparent, and we have good reason to believe that at the present time there is a widespread desire by most gas undertakings to do all possible in response to the appeal for maximum benzole recovery.

Should any small undertakings retain qualms concerning the adoption of the process, these qualms will surely be dissipated by an article on benzole recovery at a very small gas-works which we publish in the "JOURNAL" to-day (p. 389). The article deals with the plant on what, as far as we are aware, is the smallest works in the country stripping for benzole. Constructional and operating details are given of the plant, the total expenditure on which, apart from labour, was well below £100, and it has proved, not a financial liability, but an attractive revenue producer comfortably stripping 2½ gallons of crude benzole per ton from about 2,000 tons of coal carbonized per annum. The Author of the article refers to a similar installation at a works of more than twice this size, where material existed which could be used for the purpose, the total expenditure on the plant being less than £20. Apart from the financial aspect, however, there is surely great satisfaction to be derived from the knowledge that one is doing one's bit in the national interest, adding to the Gas Industry's important war effort in this direction. The article in question should prove an incentive and encouragement to very small undertakings which up to now have hesitated to add to their duties and responsibilities the recovery of benzole.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Efficiency in the Use of Fuel

At the request of the Mines Department a series of meetings has been arranged jointly by the Societies interested—including The Institution of Gas Engineers, the Society of Chemical Industry, the Institution of Chemical Engineers, and the Institute of Fuel—to inaugurate an open discussion on the best ways and means of improving the efficient use of fuel and power in existing industrial plants under present conditions. Meetings have so far been arranged to take place in Manchester on Dec. 16, Bristol on Jan. 3, and London on Jan. 8. Preceding the meeting on Jan. 8, which will be held at the Institution of Electrical Engineers at 2.30 p.m. under the Chairmanship of Sir Harold Hartley, Chairman of the Fuel Research Board, there will be a luncheon at the Waldorf Hotel (12.30 for 1 p.m.), when Mr. D. R. Grenfell, Secretary for Mines, will give a short Address. Tickets will be 8s., and members of any of the Societies wishing to be present should make application, with remittance, to the Secretary of the Institute of Fuel, 30, Bramhall Gardens, London, S.W. 5.

Contractors' Plant Call-up

Has the Gas Industry, either on the works side or among its contractors, any constructional plant that is not being employed to the fullest advantage; plant held on a site longer than necessary; plant immobilized because it might be needed; plant broken down and in need of spare parts; plant, in fact, that could have prevented the necessity of manufacturing new plant had it been available for use? We ask the question because the Ministry of Works is trying to round up all the plant that is capable of contributing to the completion of the heavy programme of building armament and munition factories, of hostels to house the workers for them, of transport and port requirements, of aerodromes and other vital war necessities. The Ministry has the task of seeing that contractors' plant is not idle, of advising the Ministry of Supply what new plant should be manufactured, and of issuing permits to purchase new plant, taking each case on its merits. Contractors and plant hire firms have been asked to provide information about idle plant and details of shortage of spare parts. Unnecessary breakdowns and many hours of fitters' time can be saved if care is taken to see that the routine maintenance, greasing, and lubrication of machines is properly done and periodical inspection organized. It is not proposed to exercise compulsory powers over the movement of plant, for the Ministry believes that difficulties in its distribution can be overcome within the industry itself. The engineer, the contractor, and his agent, must each play his part and see that plant is economically used and properly maintained, and also see to it that it leaves the job as soon as it has finished its work.

The Boon of Lighting

The Author of an article in a recent issue of *History* (the quarterly journal of the Historical Association) on the subject of "The Early History of London Street Lighting," from 1383 to the end of the last century, concludes an interesting survey with the encouraging thought that the substitution of gas for oil in the second decade of the 19th century, the establishment of a general standard for the artificial lighting of the whole of London, and (be it added) the spread of electric lighting since about the last decade of that century, have had the inestimable effect of affording a feeling of security against evil-doers. Moreover, they have enabled longer and more regular hours to be worked, dispelled the unknown terrors of the night, and conduced to a higher standard of general literacy than would have been otherwise possible. In other words, "the producers of physical light" have contributed much to our civilization.

Personal

Mr. ROBERT J. GAVIN, Engineer and Manager to the Melrose Gas Company, Ltd., for the past 8½ years, has been appointed to the post of Engineer and Manager to the Royston (Herts) Gas Company, Ltd. Mr. Gavin, who will leave Melrose at the end of the year, is a native of Galashiels, where for ten years he was Assistant Manager to the Galashiels Gas Light Company. In 1926 he obtained the post of Assistant Manager with the Kirkcaldy Gas Department. He went to Melrose in 1933. Mr. Gavin is a Past-President of the Waverley Association of Gas Managers.

* * *

Mr. A. W. OKE last month completed 50 years' continuous service as a Director of the Southampton Gas Company. His father, R. R. Oke, was a Director for 33 years, and, upon his death in 1890, A. W. was appointed Auditor, being elected a Director in the following year. Mr. Oke has many friends in the Industry, having served as director or auditor sixteen different gas and water companies.

* * *

Mr. ALEC FIELD, of the Mid-Kent Gas and Coke Company, Ltd., Snodland, has been appointed Gas Engineer and Manager to the Penrith Urban Council in succession to Mr. Gerald Hudson.

Obituary

Mr. W. H. A. CHESTER, whose death we recorded last week, began his career as articled pupil to James Herbert Brown, of Nottingham. From there he was appointed Engineer and Manager of the Middleton Gas Company, and then went to Brisbane, Australia, as Assistant to Mr. C. F. Broadhead. He joined the Australian Forces at the outbreak of the last War and went back to Brisbane for demobilization. He then returned to England and became a Director of Donald Macpherson & Co., Ltd.

Letters to the Editor

Metering of Gas in Grid Schemes

SIR,—With reference to the article under the above heading in your issue dated Nov. 26, we wonder whether our reasons for fitting the flow meters there described, and the manner in which this was done, may be of general interest.

The importance of maintaining a 100% distribution load factor, and the economic working of the gas-making plant, entails the close control of the rate of take at each station, in order that the total hourly output from (and hence input to) the grid may be maintained equal to the day's output divided by twenty-four. The holders at each station (with other devices in special cases) will balance the station send-out with its steady take.

A gas dispatcher at the central control determines the rate of take at each station after consideration of the stock of gas held there and the estimated weekly gas requirements. In normal times the rate of take may remain constant throughout the week ; during emergencies it may have to be varied a number of times a day.

To meet these conditions a volumetric governor—*i.e.*, one designed to maintain a predetermined rate of flow irrespective of inlet or outlet pressure conditions—was developed. The orifice plate incorporated in the governor serves also to impulse the flow meter, which indicates and records the rate of take (and also the inlet pressure).

The flow meter is primarily intended to indicate and record the operation of the volumetric governor. A normal station meter is invariably used immediately after the governor, and it is upon this meter that the quantity of gas sold is normally assessed.

The great variety of rates of flow required at the different stations is reduced to a number of standard ranges, in each of which the maximum rate of flow is twice the minimum. For each size of governor the orifice plates are dimensioned to accord with the standard range required. The indicator dials are calibrated in terms of cubic feet per hour to suit the standard ranges, and are easily interchangeable. A standard chart is used for all ranges, but a multiplier, dependent upon the standard range of the orifice in use, converts the record to terms of flow.

Within the limits of the standard range fitted, the attendant can vary the rate of take by turning a small control on the volumetric governor until the dial indicates the desired rate of flow, when the governor will automatically maintain it. The attendant makes only three routine inspections in 24 hours, but is always available by telephone if required by the gas dispatcher.

Each chart is changed at 12 noon daily, when the station meter readings at start and finish are entered upon it. It is then posted to the Control Office, where it is planimetered and the result compared with the station meter difference. While these instruments are sensitive to small changes in specific gravity, it has been found that they seldom differ more than plus or minus 3% from the station meter reading. Any greater discrepancy leads to both meters being subjected to routine inspection and test. When the mean meter inlet conditions of the gas have been determined over a lengthy period, it is thought that the limits of accuracy may be brought even closer.

The advantages of this method of control may be summarized thus:

(1) The attendant can read the rate of take directly in terms of cu.ft./hr.; unskilled labour may be utilized; risk of gas dispatchers' instructions being wrongly interpreted is minimized.

(2) A daily record of the rate of take and inlet pressures at each station is received at the Control Office by next morning; the chart is convenient for storage and reference.

(3) A combined pressure and flow record is built up covering many points upon the system.

(4) Inspection of the flow record ensures that any unauthorized departures from the agreed rate of take is quickly revealed.

(5) Comparison of the flow record with station meter difference checks the accuracy of both meters.

(6) The operation of the volumetric governors is checked daily; maintenance visits can be planned from an interpretation of the chart.

(7) An alternative method of metering is available in event of station meter requiring overhaul.

While it is realized that the principle of a volumetric governor is not new, it is thought that this is the first time that an effort has been made to develop a precision apparatus. Considerable improvement will yet be made, but its usefulness has now been demonstrated. We have no doubt that similar apparatus, possibly remotely controlled, and certainly with remote indication of flow and pressure, will form the basis of the operation of future gas grids in this country. We hope the makers, Messrs. Bryan Donkin and Messrs. George Kent,

will then reap the benefit of the time and technical skill they have devoted to this work at our request.

Swettenham, Yours, &c.,
Near Congleton. WEST YORKSHIRE GAS DISTRIBUTION COMPANY.
Dec. 2, 1941. H. B. TAYLOR, Chief Engineer.

"Juniors"

SIR,—I was particularly interested to read your remarks on the title "Juniors" in your issue of Nov. 26, since I believe it was I who first raised the matter. In 1937, when I was President of the London "Juniors" and also Chairman of the Joint Council of the "Juniors," I suggested a change of title and received considerable support from both "Seniors" and "Juniors" in many parts of the country. So many more important things have happened since that I forget just how the matter came to be dropped, but I think it was shelved because nobody, at the time, could suggest a better word than "Junior."

The whole point, of course, is that the word "Junior" applies not necessarily to the age or status of the individual member, but rather to the status of the associations in relation to the Institution and to the "Senior" associations. This is evidenced by the constitution of at least one "Junior" association which has three engineers and managers on its council, and practically the whole of its full members are Corporate Members of the Institution. The reason is that this particular Junior association demands educational and other qualifications for full membership almost up to the standard of the Institution itself. In fact, it is more difficult to become one of these "Juniors" than it is to become a "Senior" in its respective parent "Senior" association.

But why all these associations? Are they really necessary? Do they serve any useful purpose either to the Industry in general or to the individual? The latter, for the most part, is a member of three organizations—the Institution, and his appropriate "Senior" and "Junior" associations. Would he not get better value for his three subscriptions if he lumped them all together and put the total into the more deserving coffers of the Institution?

The time has come, I respectfully suggest, for us seriously to review this clumsy organization of our technical associations. We are repeatedly being warned that, after the war, we must get together more closely and have a unified policy within the Gas Industry. Why not start at once with our technical associations?

Let there be only the Institution. But let it have its District Branches taking the place of the existing "Senior" associations. Thus we should have the "Southern Branch of The Institution of Gas Engineers," the "Scottish Branch," &c.

Any technical, or embryo technical, employee within the Industry and on the professional, as distinct from the operational, side, and who is neither a Corporate Member nor an Associate of the Institution, must be a student. If he is a *bona fide* student taking one of the Institution's Major Courses he should become a Student of the Institution and, as such, could attend the meetings of his District Branch of the Institution. Any Branch having a sufficient number of students would naturally arrange special meetings for them and would do all in its power to encourage their activities. Thus we should cater for our genuine Juniors (and, this time, I omit the inverted commas!). What is more, the Junior would be gaining all the time by the advice and assistance of the Seniors.

Under such a scheme the Institution might publish a monthly journal reporting the activities of all its branches, thus making technical information generally available to all—including the Juniors.

To assist the Junior (or shall we say "Student"?) still further, the Institution's Branches should maintain close co-operation with the technical colleges and institutes in their respective districts. The Student would thus have direct and authoritative approach to the Institution when requiring advice about his course. Under the present arrangement it must be confessed that certain "Senior" and "Junior" associations have failed most miserably in this connexion, being merely passers-on of correspondence.

Of course, there is nothing original in any of this. Our sister institutions—Civil, Mechanical, Electrical—are all organized on somewhat similar unified lines, and mention of the first of these reminds me that those of your readers who have not done so would, if they are interested in this question of "Juniors," be further interested to read Professor C. E. Inglis' Presidential Address to the Institution of Civil Engineers in October. He strongly advocates this idea of closer co-operation between the experienced engineer and the student.

Westminster, S.W. 1. Yours, &c.,
Nov. 29, 1941. R. N. LE FEVRE.

Coke as an Asset

SIR,—Your timely reminder in your issue of Nov. 26 that coke is not a liability but a valuable asset was a very necessary statement of fact.

Coke does not interfere with the sales of gas more effectively than any other solid or liquid fuel, so why remove our solid product from the market and give our competitors a free field? While a solid fuel market exists we should be prepared to meet its demands. A study of the potentialities and possible future development of coke as indicated in your Editorial in the "JOURNAL" of Sept. 17, 1937, and also the developments in coke-burning appliances, should do much to curb this irresponsible repudiation of one of our main assets.

Acknowledgment of these facts is quite consistent with the ideal of gaseous fuel ultimately replacing both the liquid and solid types.

Yours, &c.,
Nov. 30, 1941. "LOGIC."

All-Gas Canteen at Middlesbrough

Our photograph shows part of the all-gas canteen which Middlesbrough Gas Department has recently equipped at a local engineering

works. The arrangement of the kitchen did not permit of a fully comprehensive view of the equipment, but among the appliances installed were: 1 double compartment vegetable steamer, 1 single pan fish frier, 1 double oven externally heated, fitted with solid hotplate and 2 triple concentric burners, 1 30-gallon vegetable boiler, 1 No. 187 auto boiling water heater, 2 hot closets, 1 Stott No. 3 auto heater, providing hot water for dishwashing, &c.,

The dining room is heated by 6 No. 720 Luma heaters.

The firm concerned had already decided to install steam-heated equipment with a solid-fuel boiler before the Gas Department heard of the installation, but it was finally resolved to alter their plans in favour of gas.

In a Warship Week procession recently held in Birmingham, the Parkinson Stove Company's exhibit aroused considerable interest. It was designed to represent the bridge and a portion of a destroyer with a uniformed crew.

Regional Fuel and Power Controller

The President of the Board of Trade has appointed Major E. Cadbury, D.S.C., D.F.C., J.P., to be Regional Fuel and Power Controller for the South-Western Region.

He has also appointed Mr. H. Carleton Walker to be Deputy Regional Fuel and Power Controller for Wales, with special responsibilities in North Wales.

The Next Meeting of the Members of the Fuel Luncheon Club will take place at the Connaught Rooms, Great Queen Street, Kingsway, W.C. 2, on Friday, Dec. 19, at 12.40 for 1.10 p.m., when the after-luncheon Address on "Fuel: The Wide Aspect" will be given by Professor C. H. Lander, C.B.E. (Professor of Mechanical Engineering at the City & Guilds College). The cost of the Luncheon to non-members will be 7s. exclusive of gratuities and liquid refreshments. Any such visitor wishing to be present is asked to forward his remittance of 7s. to the Secretary of the Club, when a ticket will be sent to him.

A New Private Company, Scottish Rural Gas, Ltd., has been registered in Edinburgh with a capital of £3,000 in £1 shares. The Company will carry on business as distributors of rural gas and appliances. The Directors are: Robert Edmiston, Manager; W. S. Ferguson & Co., Ltd., Friarton, Perth; and George Torquil MacLeod, Chemical Manufacturer, Neidpath Road, Whitecraigs, Renfrewshire.

BENZOLE RECOVERY AT A VERY SMALL GAS-WORKS

[Contributed by the Engineer]

ARISING out of the editorial in the "GAS JOURNAL" of November 12, 1941, in which reference is made to benzole recovery on small undertakings, it would perhaps be interesting and of some use to those engineers in charge of undertakings which, up to the present, have not considered their size sufficient to warrant putting in benzole plant for financial as well as technical reasons, to reproduce the following particulars of a benzole stripping installation on what, as far as can be ascertained, is the smallest works in the country which is at present carrying out this process.

As early as 1937 I realized that it was practically inevitable that the indigenous production of benzole and toluene would become of great importance to the nation; furthermore that it would be particularly valuable for a large number of small, and therefore less vulnerable, undertakings to make a contribution which in its cumulative effect might be more attractive than an equivalent production from a smaller number of considerably larger works.

It is fairly obvious that for a small works of the type under discussion (that is, up to 50 million cu.ft. per annum) the outlay necessary for the installation of a benzole plant would most likely take all the cream off benzole production as a financial proposition, although, personally, I regarded the technical advantages of the process as well as the national aspect as being more than a compensation for any financial loss which might result from such an installation. It was found, however, upon studying the problem, that this comparatively simple process could be installed with very little capital expenditure if a certain amount of "scrap" material was available, and if one was prepared to spend a certain amount of time in the design and construction of what has proved to be a very interesting and effective little job.

The satisfactory results obtained from this little plant have well repaid, from every aspect, the small expenditure of money and time.

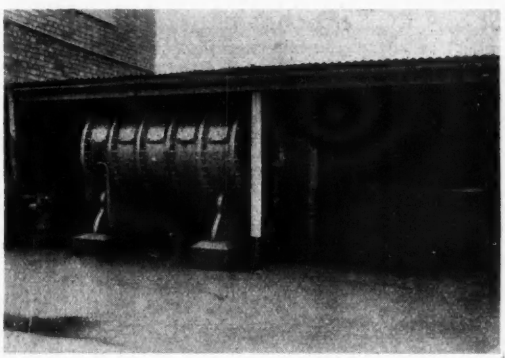

FIG. 1.

Figs. 1 and 2, and a rough diagram, fig. 3, show the main details of the essential parts of the plant. The general procedure follows the accepted oil washing process, and is quite similar in essentials to that involved in the standard plants which are being, and have been, installed to a fairly considerable extent on gas-works with a comparatively much larger gas output. The plant was started up in 1937 and has functioned practically continuously ever since, giving no trouble and requiring a negligible amount of attention, and is comfortably stripping 2½ gallons of crude benzole per ton from about 2,000 tons of coal carbonized per annum.

Briefly, wash oil (gas oil has been used effectively, but at present a special absorbing oil supplied for this particular purpose is being found rather more efficient) is circulated through a rotary brush scrubber *via* the benzolized oil storage tank to a simple oil/oil heat interchanger, to an open-steam still, back through the above heat interchanger, to a de-benzolized oil separating tank (to remove any water) and through an oil cooler back to the scrubber. The vapours from the still pass through a water cooler to a benzole/water automatic separator whence the condensed benzole overflows to the benzole storage tank through a sight-drip. One product only is thus formed and is collected at periodic intervals (one or two months) by the refiners.

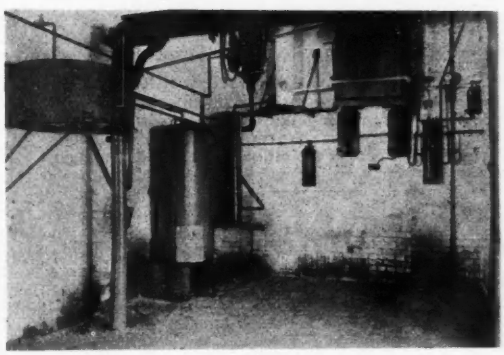

FIG. 2.

The only items which I have found it necessary to purchase for this installation were (*a*) a second-hand brush-filled rotary washer complete with inlet and outlet and by-pass valves which was actually of about double the capacity for the job, and from which two sections were removed during its overhaul, and (*b*) a benzole storage tank of 1,500 gallons capacity.

The one pump required for the whole of the circuit was available

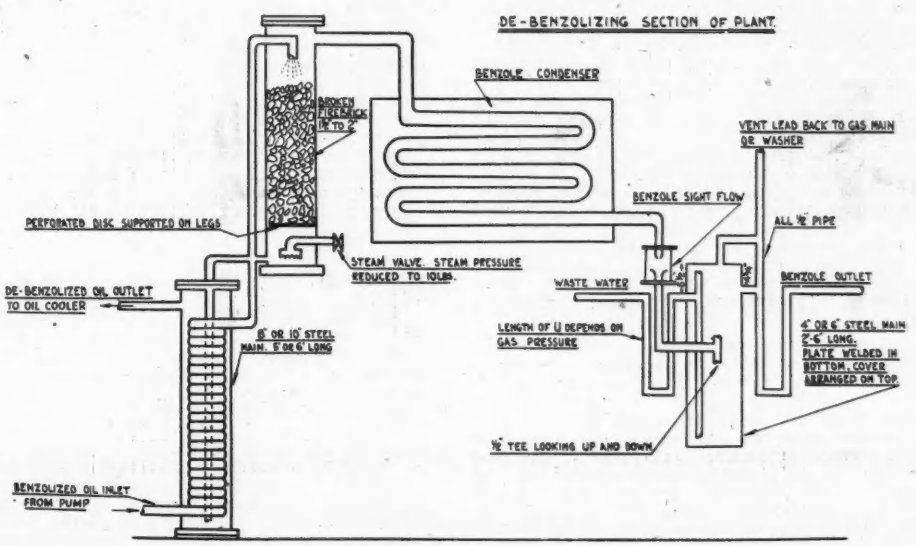
DE-BENZOLIZING SECTION OF PLANT
BENZOLE CONDENSER
BROKEN FIRE BRICK 1" TO 2"
VENT LEAD BACK TO GAS MAIN OR WASHER
BENZOLE SIGHT FLOW
ALL ½" PIPE
PERFORATED DISC SUPPORTED ON LEGS
STEAM VALVE. STEAM PRESSURE REDUCED TO 10LBS.
WASTE WATER
BENZOLE OUTLET
DE-BENZOLIZED OIL OUTLET TO OIL COOLER
8" OR 10" STEEL MAIN. 5' OR 6' LONG
LENGTH OF U DEPENDS ON GAS PRESSURE
4" OR 6" STEEL MAIN 2-6 LONG. PLATE WELDED IN BOTTOM. COVER ARRANGED ON TOP.
½" TEE LOOKING UP AND DOWN
BENZOLIZED OIL INLET FROM PUMP

FIG. 3.

on the works and, as will be seen from the simple character of the remaining parts of the plant, these were all built up from material available on the works.

The benzolized oil storage tank (adjacent to the washer, fig. 1) consists of a disused wet station meter case. The oil/oil heat interchanger consists of a serpentine coil made of ¾ in. pipe, at 2 in. pitch, fitted into a shell consisting of a 5 ft. length of 8 in. diameter steel main, the hot oil flowing outside and the cold oil inside the coil. The still, lagged on the outside, was made from a 5 ft. length of 8 in. diameter steel main, and is packed with broken firebrick carried on a perforated plate. The steam enters at the bottom through an inverted V-notched hood, the oil, of course, being sprayed in at the top. The separator (oil-water) was made from a large hot water cylinder, and a cock is provided at the bottom for draining off separated water at intervals of one or two days.

The oil cooler (shown on the extreme left of photograph, fig. 2) consists of a coil through which the oil passes, surrounded by a cylindrical water tank of fairly large capacity. The benzole vapours and steam from the still pass through a similar cooling system shown in the photograph (fig. 2) as a rectangular tank supported on brackets on the wall. Steam for the still is taken from the works boiler after throttling down to about 10 lb. per sq in. pressure near the plant and is controlled by a wheel valve. Cooling water for the whole of the plant is delivered by gravity from a gasholder tank, and flows to a sump from which it is pumped back to the holder with other surface water drainage.

It will be realized from the above that the total cost of this plant is negligible; actually, apart from labour, the total expenditure was well below £100.

In the case of a similar installation at a works of more than twice the size in the neighbourhood, where for the oil washer an existing tower scrubber was used, and as a benzole storage tank an old boiler shell was adapted, the total actual expenditure, apart from labour, amounted to less than £20.

In the case of medium sized undertakings there has obviously been some hesitation with regard to the installation of benzole plant because of the fairly considerable capital expenditure which is entailed, and in consequence a not inconsiderable proportion of the benzole revenue would be swallowed by repayment of capital alone. In the case of the above installation the directors and management of this undertaking have definitely found a very attractive increase in the annual profits since the benzole plant has been working. There is, above all, the added feeling that one is doing an extra bit in the national interest, and this, in itself, should prove an urgent incentive to many gas engineers who, up to now, may have had to weigh very carefully the financial aspect of benzole recovery.

CREOSOTE OIL AS A FUEL IN I.C. ENGINES*

By MR. R. J. BRAMHALL, M.Sc., A.I.C., Rochdale

THE first experiments with creosote oil at Rochdale date back to 1932. About this time the price obtainable for creosote oil was in the region of 1½d. per gallon compared with the normal price of about 4d., and experiments were carried out to see whether this cheap oil could be used as a fuel in the ordinary spark ignition engine. It was realized that it would be impossible to start up on creosote oil, and so a special inlet and exhaust manifold were designed to fit the engine of a 6-ton Leyland lorry, in which the inlet ports and gasways received heat from the exhaust gases which passed around them on their way to the exhaust pipe. Two Solex carburetters were fitted, one being supplied with petrol and the other with creosote oil. The petrol carburetter was operated by Bowden cable and the creosote carburetter by the accelerator pedal. Starting up was done on petrol, and when the engine was warm the accelerator pedal was depressed and the petrol carburetter shut off. Providing the engine and manifold were warm enough no flat spotting took place and the engine continued to run on the cresote oil. This lorry ran very satisfactorily on ordinary light gravity creosote oil right from the start, and it was only on account of various troubles connected with sump dilution and lubrication that efforts were made to improve the quality of the creosote and provide a more suitable fuel. The untreated light gravity creosote oil used at the start was made from vertical retort tar and tested as follows:

Sp. gr. 0.987 at 60° F.	Open flash point 200° F.
Phenols 25% by vol.	Closed ,, 186° F.

Distillation Range (Engler Side-arm Flask).

First drop 180° C. 50% at 244° C. 90% at 347° C.

The oil was fluid at 28° F.

Ordinary mineral lubricating oil was used in the lorry engine, and tests of this after 400 miles' running showed that there was 11% sump dilution and this was found to be the heavy ends of the creosote oil. Pitchy gummy deposits were also found in the sump and were due to the combination of the phenols in the creosote with asphaltum from the lubricating oil. The use of mineral lubricating oil was discontinued and first pressure castor oil used instead, and no further trouble was experienced with these deposits. As regards sump dilution, as one would expect this varied with the nature of the work done by the lorry. When on short journey work with many stops and starts the sump dilution was in the region of 11% by vol., but when on long journey work the dilution dropped to 4% by vol. It appeared that at the change over from petrol to creosote an excess of liquid creosote was drawn into the engine and caused dilution. As much of the work done by the lorry entailed frequent stops and starts, it was thought advisable to improve the quality of the creosote oil by washing out the bulk of the phenols and cutting out the very high boiling end of the oil. Accordingly a batch of light creosote was distilled and a lighter fraction collected. This was washed with caustic soda solution until the phenol content was 4% by volume. An oil was obtained distilling—

First drop.	47%.	90%.	Dry.
180° C.	200° C.	240° C.	270° C.

Sp. gr. 0.904 at 60° F.
Phenols 4% by volume.
Closed F.P.—158° F.

This oil gave excellent results and sump dilution was maintained at 4% by volume. As regards performance of the engine, hill climbing and staying power were very good and better than with commercial petrol.

Occasionally misfiring took place, particularly after remaining stationary for a short time, and this was traced to the cold breeze blowing out to the forepart of the manifold, but this misfiring was eradicated by fitting a cowl over this part. The acceleration was quite snappy. There was a slight puff of blue smoke from the exhaust on the change over from petrol to creosote, but as the engine got under load this disappeared. It must be remembered that our carburetter arrangements were very crude, and with modern apparatus these carburation troubles have disappeared. The condition of the engine after 3,000 miles' running was excellent. The average consumption of petrol and creosote with this arrangement was 1 part of petrol to 1 part of creosote over 3,000 miles of short journey work, but the proportion of creosote used increased on long journey work up to 1 part petrol to 5 parts creosote.

The cost of washing and distilling the creosote was 2½d. per gallon, bringing the price of creosote up to 4½d. per gallon. The special manifold and carburetters cost £45, and the price of petrol at that time was 1s. 0½d. per gallon. Much consideration was given to the idea of converting the rest of the lorries to creosote, but it was finally decided not to, in view of the short-journey nature of the work. On long non-stop journey work I am firmly convinced that the use of creosote would have been a paying proposition.

Shortly after this period the price of creosote improved and stocks decreased, and so the whole matter rested until the present war brought up the question of conservation of petrol to the fore. We were in a position to supply a suitable fuel, and Mr. Mangoletsi, of Manchester, had improved the carburation apparatus so that results indistinguishable from those given by petrol were given by creosote, but owing to the need for creosote for hydrogenation purposes and the passing of emergency powers prohibiting the use of creosote as a general motor fuel, the matter has been carried no further.

The above experience was useful to us in connexion with experiments which were carried out using a mixture of creosote oil and petroleum fuel oil in compression ignition engines.

Prior to the outbreak of war the Rochdale Corporation Transport Department went into the question of alternative fuels in order to ascertain to what extent fuel supplies could be augmented if and when fuel rationing commenced. The buses run by the Transport Department are fitted with diesel engines, and it was decided that oil fuel was preferable to other fuels owing to the modifications or additions to the engine required, and the necessity of providing containers and the difficulty of fitting them. It was suggested that creosote could be used to augment the fuel oil. Creosote oil by itself was not satisfactory as a fuel in diesel engines as it requires more heat to ignite it, and when ignited it burns more rapidly than petroleum fuel oil. This would necessitate an enormous compression ratio and a dangerous pressure might be developed on ignition. It was thought that if creosote were mixed with petroleum fuel oil the petroleum fuel oil would ignite and cause ignition of the creosote.

Experiments were carried out as follows: It was recognized that phenols when mixed with petroleum oil caused gumming due to the formation of asphalt-phenolic substance, and this formation is susceptible to temperature variations; the lower the temperature the greater the deposition. Tests on various mixtures of creosote and petroleum fuel oil showed that below 30% of creosote in the mixture there were appreciable deposits reaching a maximum of 15% creosote, while between 30% creosote and 50% creosote the deposits were not as great. These tests were carried out at 10°F. below freezing-point. Mixtures of creosote below 30% were therefore prone to trouble due to deposits unless special precautions were taken. Another factor limiting the amount of creosote in the mixture was the reduced ignition quality of the creosote mixture. During the cold weather it was

* Paper read before the Manchester and District Junior Gas Association, at Liverpool, on Nov. 1, 1941.

found that while direct injection engines would start on a mixture of over 30% creosote, some other types of engine would not do so. In July, 1939, one bus with a direct injection engine was tested with a 50–50 fuel oil and creosote mixture, the creosote being unwashed and having a gravity of about 1.0. The vehicle gave satisfactory results when running. No complaints were received from the drivers. No fumes were apparent and the performance of the bus was normal, and the m.p.g. showed no apparent change. Owing to the phenols present it was found necessary to change the fuel oil filter each night to prevent the deposits which accumulated from blocking the filter. The starting up was impaired and the engine had to be turned over for a longer period than with petroleum oil alone. Also until the engine warmed up the exhaust was in the form of a dense white vapour. On the outbreak of war the Transport Department decided to put the whole fleet of buses on creosote and fuel oil mixture, after permission had been granted in order to augment the fuel oil supplies approved by the Traffic Commissioners, and a considerable amount of experience in the use of such mixtures has been obtained.

The processing of the creosote-fuel oil mixture at the bus station, which has not been modified in any way since creosote has been used in bulk, is to run petroleum fuel oil into a tank, and the correct amount of creosote is added. The mixture is allowed to stand 24 hours in the tank and then put through a centrifuge running at 7,000 r.p.m., and passing 350 g.p.h. This removed any free water and most of the deposits which had formed and assisted in the mixing of the two fuels. With unwashed creosote oil it was found that even after centrifuging there was a slow formation of gummy deposits, and during the cold weather of the early part of 1940 several autovac failures occurred due to the bakelite flaps becoming gummed up. It was found that brass flaps were not prone to the trouble and these were fitted. I might state at this point that mineral lubricating oil has been used throughout. On account of the slow formation of gums it was decided to wash the creosote oil down to 4% phenol content, and since March, 1940, a washed light creosote has been mixed with the petroleum fuel oil and has been very satisfactory. The quantity of sludge removed from the centrifuge has amounted to only 5% of that obtained from the unwashed creosote, and instead of being gummy it is of a more powdery nature.

It was also found that some corrosion occurred with unwashed creosote, particularly with the brass gauze filters and fuel delivery pump springs, but this corrosion is now negligible with washed creosote.

Results of tests on the engine test benches gave fairly uniform figures and the conclusions reached confirmed the results obtained on the road. A bench test carried out on a 6-cylinder A.E.C. engine using a cathode ray indicator showed that with a fixed fuel pump setting and speed, the power increased by about 3% when using 30% creosote-fuel oil mixture. Another bench test on a 6-cylinder Leyland engine using 30% creosote-fuel oil mixture showed that with the standard pump setting the fuel consumption increased from 5–8% and the power from 5–17%, and when the pump was adjusted to give approximately the same power as with petroleum fuel oil, the consumption showed a decrease of up to 10%.

The washed creosote mixed with the petroleum fuel oil and used in these tests tested as follows:

Sp. gr.	0.943 at 60° F.
Open flash point	170° F.
Closed "	151° F.

Distillation from Engler Flask.

First drop	180° C.
50%	253° C.
90%	336° C.

Phenols not over 4% by volume.
The oil was fluid at 28° F.

In conclusion, this oil is now our standard diesel fuel oil, and justification for this is that some individual bus engines have completed 60,000 miles on the washed creosote-fuel oil mixture without trouble.

NEW PATENT

Gas Fires

Radiation Ltd., Harold Hartley, and U. C. Evans have been granted a patent (No. 539,572 ; application date, June 14, 1940) for a new type of gas fire.

The invention comprises the combination of a gas burner and a flame enclosure situated above the burner, the enclosure being bounded at its rear side by a firebrick back or other suitable refractory body and at its front side by imperforate and (wholly or in part) translucent refractory material, such as fused silica, this enclosure being open at its upper and lower ends and having its front and rear surfaces sufficiently adjacent to each other to exert a scrubbing action on the hot gases rising from the burner.

Fig. 1 is a sectional side elevation of a gas fire constructed in accordance with the invention.

Any conveninent metal or other frame-like body part is employed having a pair of vertical side members *a* and a horizontal bottom member *b*, the latter member being of hollow form. In the interior and at a position adjacent to the front and upper sides of the bottom member *b* is mounted a horizontal burner tube *c* having a plurality of nozzles or jets as *d* extending from its upper side through openings as *e* in the upper side of the bottom member *b*, so that gas emerging from the nozzles or jets can be ignited in air streams flowing from the interior of the bottom member, through openings. The admission of air to the bottom member is controlled by any convenient means (not shown). Above the burner *c*, *d* is mounted a flame enclosure *f*. This enclosure occupied the front of the opening bounded by the body part *a*, *b* and is relatively narrow from front to back. The rear surface of the enclosure *f* is formed by a firebrick *g*. Also the ends of the enclosure may be made from similar material and are preferably formed integrally with the back *g*. The front surface of the enclosure *f* is imperforate and is formed by a thin plate or plates or thin strips *h* of fused silica or quartz-like material which is translucent and is capable of being raised to incandescence by the heat of the burner flames. When plurality of plates or strips of the material is employed the adjacent edges of the plates or strips are arranged in close contact with each other as shown. The translucent front of the enclosure is protected by a grid or grids *i* of refractory material carried by the body part *a*, *b*. Alternatively the front of the flame enclosure may be formed by a grid having its spaces filled with pieces of the translucent material.

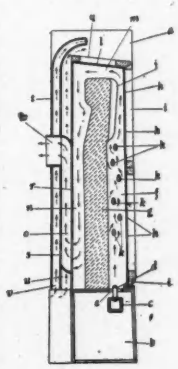

Fig.1

The proximity of the front and rear surfaces of the flame enclosure *f* is such that those surfaces can exert a scrubbing action on the flames. This action may be augmented by rib or thorn-like projections on one or each of the surfaces. Thus, in the example shown, the front surface of the firebrick back *g* is formed at its upper part with vertical rib-like projections *j*. Alternatively or in addition the scrubbing action on the flames may be augmented by a horizontal bar or bars as *k* of refractory materials loosely mounted within the enclosure *f*. Also if desired a body or bodies made in the form of a mesh or coils of thin refractory material which can be quickly raised to incandescence by the flames may be mounted in the enclosure.

The lower end of the enclosure *f* is open and communicates with the openings *e* in the bottom member *b* of the body part, the openings being of sufficient size to admit to the enclosure the amount of air required to ensure proper combustion. The upper end of the enclosure *f* is also open and may communicate directly with a flue outlet situated at the upper rear portion of the body part, but preferably and as shown the upper end of the enclosure communicates through a duct *m* over the upper edge of the firebrick back *g* with a vertical duct *n* at the rear side of the back, the two ducts serving to conduct hot gases from the enclosure rearwardly and downwardly to a vertical flue passage *o*. The flow of the hot gases is indicated by the arrows shown in full lines in fig. 1. The duct *m* is formed by arranging over the upper edge of the firebrick back *g* a strip *l* of thin translucent material similar to that forming the front of the flame enclosure *f* and likewise protected by a refractory grid *q*. The duct *n* is formed by arranging behind the firebrick back *g* a vertical metal sheet *r*. Near its lower end the duct *n* behind the firebrick back *g* communicates with the lower end of the flue passage *o* which is situated between the metal sheet *r* and another metal sheet *s*. The latter metal sheet is situated between the metal sheet *r* and a third metal sheet *t*, the three sheets forming between them a pair of vertical ducts *u*, *v* behind the gas duct *n*. The ducts *u*, *v* are open at their upper and lower ends so that air from the room in which the gas fire is situated can flow upwardly through them as indicated by the arrows shown in broken lines in fig. 1, and receive heat from the hot gases flowing through the adjacent gas duct *n* and the flue passage *o*, the latter terminating at its upper end in an outlet *w* which extends rearwardly through the rearmost duct *v* at a position below the level of the upper edge of the firebrick back *g*. Preferably and as shown the upper ends of metal sheets *s*, *t* are deflected forwardly over the top of the hot gas duct *m* to direct heated air from the ducts *u*, *v* towards the front of the gas fire.

The invention is not limited to the specific materials employed for making the imperforate front of the flame enclosure as any other suitable refractory materials may be used provided always that such materials are translucent and capable of being raised to incandescence. Further the invention is not limited to any particular shape or disposition of the back and front portions of the flame enclosure. While for most purposes they would be most conveniently made flat or substantially flat, they could be bowed to present a convex or concave appearance. Also they may be disposed vertically or inclined slightly in the rearward direction. Moreover the back of the enclosure instead of being made from firebrick may be made from any other suitable refractory material.

The patentees state that by this invention they are able to provide a gas fire which combines a novel and pleasing apaearance with high thermal efficiency.

The British Compressed Air Society has published a useful book, *Compressed Air Terms and Standards*, containing many features of interest to compressed air users, including articles on the selection of plant, care and maintenance of compressors, various types of pneumatic tools and air consumptions, and also British Standard for the Testing of Air Compressors and Exhausters. Copies may be obtained from the Hon. Secretary of the Society at Boreas Works, Beddington, Croydon, price 2s. 6d. each, post free.

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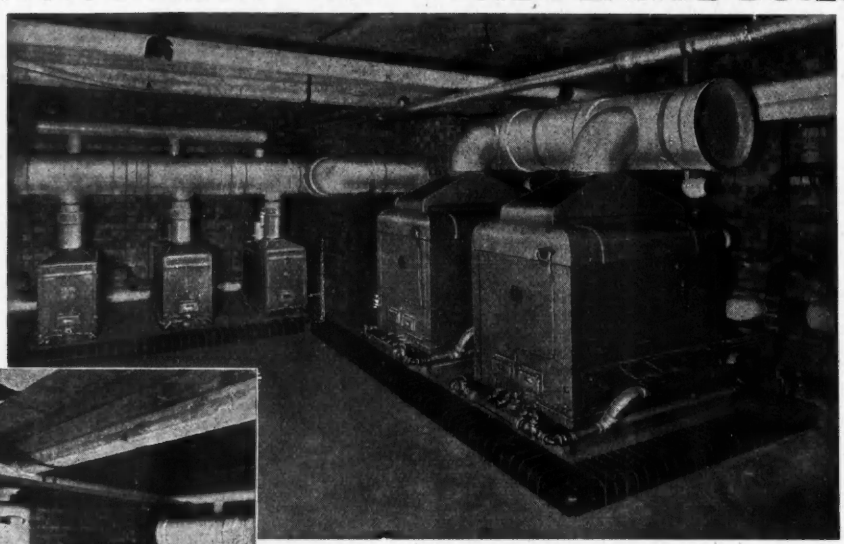

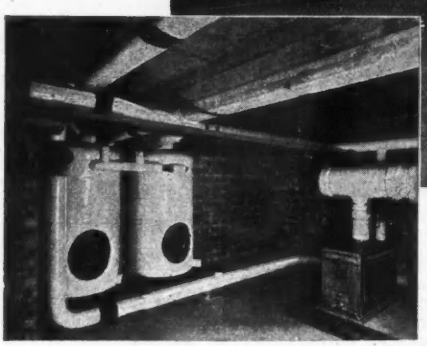

A photograph taken in the Heating Chamber of a new Hospital recently built for War-time requirements, eventually to be applied to the normal activities of the district. Twin "REX" gas-fired heaters having a combined output of 1,500,000 B.Th.U. hourly are provided for low pressure Hot Water Heating, while for Hot Water Service, the plant comprises triple "D" Series "REX" Domestic units, output 600,000 B.Th.U. hourly, with storage of 600 gallons. Floor space and flue capacity are provided for future extensions.

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Gas Products Prices

The London Market

Dec. 8.

Current prices of Coal Tar Products in the London market are about as under:

Pitch nominal; creosote 5d. to 5¼d.; refined tar 4d. to 4¼d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole 1s. 10d.; 95/160 solvent naphtha 2s. 5d. to 2s. 8d.; and 90/160 pyridine 13s. 6d.; all per gallon naked *ex* Makers' Works. By the Direction issued under the Control of Coal Tar Order, 1941, maximum prices have been fixed for all grades of Naphthalene. The maximum price for refined crystal naphthalene in 2-cwt. bags and in 4-ton lots is £23 per ton delivered.

The Provinces

Dec. 8.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4¼d. to 4¾d.; low gravity, 4¼d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080), 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10.

Middlesbrough Gas Charges

The Middlesbrough Town Council has approved the following further reductions in charges for gas, to take effect from Jan. 1, 1942:

(i) 1d. per 1,000 cu.ft. on all prepayment meter consumptions, making the new price 2s. 10d. per 1,000 cu.ft.
(ii) 1d. per 1,000 cu.ft. on ordinary meter consumptions between 5,000 and 10,000 cu.ft. per quarter.
(iii) 2d. per 1,000 cu.ft. on ordinary meter consumption exceeding 10,000 cu. ft. and up to 20,000 cu.ft. per quarter.

The basic price for consumptions up to 5,000 cu.ft. per quarter for all ordinary meter consumers will remain the same—*i.e.*, 2s. 2.1d. per 1,000 cu.ft. net = 5.22d. per therm.

Previous reductions have been made recently as follows: Price reduced by 1d. per 1,000 cu. ft. on prepayment consumptions from Jan. 1, 1941. All meter rents abolished from Jan. 1, 1941. Price reduced by 2d. per 1,000 cu.ft. for central heating consumers, to 1s. 6d. per 1,000 cu.ft. = 3.6d. per therm, from Jan. 1, 1941.

At a Recent Meeting of the General Committee of the National Federation of Gas Coke Associations it was unanimously agreed that Mr. R. W. Foot should continue as Chairman of the Federation but that, in view of his appointment to the British Broadcasting Corporation, Colonel H. C. Smith should act as Executive Chairman in the absence of Mr. Foot.

At a Recent auction sale at Peterborough £1529 Consolidated Ordinary Stock of the Peterborough Gas Company made £150 10s. and £151 10s. per £100. For the last 13 years 7½% has been paid.

Tar Products in Scotland

GLASGOW, Dec. 6.

Deliveries to approved consumers are proceeding quite rapidly, but business in "spot" lots is difficult.

Refined tar is well held in the home market for 4¾d. to 5d. per gallon, while for export price is now called 4d. to 4½d. per gallon, both f.o.r. naked.

Creosote oil: Production finds a ready outlet as available with prices firm as under: Specification oil, 5¾d. to 6d. per gallon; low gravity, 6½d. to 7d. per gallon; neutral oil, 6d. to 6½d. per gallon; all *ex* Works in bulk.

Cresylic acid: There are some difficulties in producing the proper qualities but supplies, when available, readily command the following: Pale, 99/100%, 4s. 4d. to 4s. 8d. per gallon; Pale, 97/99%, 4s. to 4s. 3d. per gallon; Dark, 97/99%, 3s. 9d. to 4s. per gallon; all *ex* Works in buyers' packages.

Crude naphtha remains unchanged at 6½d. to 7½d. per gallon *ex* Works in bulk, according to quality.

Solvent Naphtha: 90/160 grade is 1s. 8½d. to 1s. 9d. per gallon and 90/190 Heavy Naphtha is 1s. 4½d. to 1s. 5½d. per gallon.

Pyridines are without interest with 90/160 grade at about 14s. per gallon and 90/140 grade about 16s. per gallon.

The British Standards Institution announces that, in view of the continuing expansion of the work of the Institution and the development of its relations with the Government Departments and with standardizing authorities overseas, the General Council has appointed an Executive Committee under a permanent Chairman. The Executive Committee will keep all the activities of the Institution under review, and report to the General Council from time to time as may be necessary. Mr. C. le Maistre, C.B.E., who has been connected with the movement almost since its initiation, and who for the past 25 years has been its chief executive officer, has been appointed full-time Chairman of the Executive Committee, and Mr. P. Good, C.B.E., for several years Deputy-Director and recently Joint-Director, has been appointed Director and Secretary of the Institution.

Consumption of Gas for the manufacture of munitions in the United States is rapidly rising and may shortly account for more than half the total amount of gas used for industrial purposes in America. America's defence programme calls for huge amounts of various metals. Aluminium consumption of 450 million pounds in 1940 is expected to rise to 800 million pounds next year; magnesium consumption will increase from 25 million pounds to 200 million pounds; copper, steel, and metal alloys will all be needed in tremendous quantities. In the manufacture and heat treatment of this vast amount of metal fuel is an essential and, as in Great Britain, there is a steadily rising demand for the services of gas. Automatic gas furnaces for the heat treatment of shell and ammunition components, large continuous furnaces for the heating of steel alloys to make seamless tubing for guns, and gas apparatus for the heat treatment of aluminium in aeroplane manufacture are three of these services. In the making of tanks, guns, aeroplanes and other munitions that are flowing in a swiftly increasing stream from American factories gas is playing an important part.

Metro
TRADE MARK

IN normal circumstances this space is occupied by information concerning the many Coal Tar and Ammonia Chemicals produced by the South Metropolitan Gas Company.

MANY of these products, required in the last war, are wanted more than ever to-day for war purposes.

CERTAIN "Metro" products, however, are available for normal business, such as Medium Soft Coal Tar Pitch, Creosote Oils, Dry Neutral Sulphate of Ammonia, etc., and enquiries for these should be directed to the manufacturers:—

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Products Department:
REGIS HOUSE,
KING WILLIAM STREET,
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Telephone : AVENUE 2755.

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GAS STOCKS AND SHARES

There was a brighter tendency at the opening last week without much, if any, expansion of business, but Libyan and Far Eastern uncertainties led to profit taking in those sections recently showing firmness, especially among industrials. British Funds, although idle, were inclined to harden and 2½% Consols closed ¼ higher at 82½ *x. d.* Towards the close a demand set in for home rail stocks, L.M.S. being a strong feature. Oil shares were also brighter, but rubbers and the Kaffir market were neglected and prices sagged.

The volume of business in the Gas Market was also on a reduced scale, but prices continue firm, and, as will be seen below, there were more changes than usual and most of these were rises. Inquiries for Alliance & Dublin took the price up 5 points to 97½, while Bombay and Severn Valley shares were also brighter features. In the Supplementary List Hampton Court changed hands at 78 and the quotation was marked up 6 points to 77½.

The Directors of the Oriental Gas Company have declared a final ordinary dividend of 4½%, again making 8% for the year, the rate paid for many years past. The last recorded transaction in this stock was at 124 last month, and at this price the yield works out at £6 9s. per cent.

Quotations on the London and Provincial Stock Exchanges

OFFICIAL LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 4.	Rise or Fall on week.
1,767,439	Sept. 15	7	6	Alliance & Dublin Ord. ...	95—100	+5
374,000	June 30	4	4	Do. 4 p.c. Deb. ...	95—100	...
957,608	Nov 10	5	5	Asscd. Gas & Water U'd'ts Ord.	14/3—15/3	+1/-
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	14/—16/-	...
535,545	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	14/—16/-	...
336,646	,,		4	Do. 4 p.c. Irred. Cum. Pref.	9/6—11/6	...
561,370	Aug 18		7	Barnet Ord. 7 p.c.	115—120	+3
300,000	Oct. 27	1/4⅜	1/9⅜	Bombay, Ltd.	21/6—23/6	+6
690,407	Aug. 25	7	7	Bournemouth 7 p.c. max. ...	118—123	...
362,025	June 16	4	4	Do. 4 p.c. Deb. ...	90—95	...
659,955	Oct. 20	4⅜	2½	Brighton, &c., 5 p.c. Con. ...	60—65	...
855,000	Sept. 22	6	6	Brit. Gas Light Ord.	71—76	...
545,000	June 16	5½	5½	Do. 5½ p.c. 'B' Cum. Pref	105—115	...
120,000	,,	4	4	Do. 4 p.c. Red. Deb.	75—80	...
10,000	Nov. 6 '33	6	4	Cape Town, Ltd., 4½ p.c. Cu. Pf.	¼—¾	...
626,860	July 21	6	6	Cardiff Con. Ord.	90—95	...
24,500	Sept. 29	7	7	Colombo 7 p.c. Pref.	19/—21/-	...
764,169	Sept. 29	-/11.48	-/11.48	Colonial Gas Assn. Ltd. Ord. ...	14/—16/-	...
400,000	,,	1/3.30	1/3.30	Do. 8 p.c. Pref. ...	19/—21/-	...
1,748,935	July 22 '40	2	3	Commercial Ord.	31—36	...
620,000	June 9	3	3	Do. 3 p.c. Deb.	55—60	...
286,344	Aug. 18	5	5	Do. 5 p.c. Deb.	87—92	...
807,560	Aug. 11	6	6	Croydon sliding scale	90—95	...
644,590	,,	5	5	Do. max. div.	80—85	...
620,385	June 30	5	5	Do. 5 p.c. Perp. Deb. ...	99—104	...
179,500	Aug. 18	5	5	East Surrey 'B,' 5 p.c.	65—70	...
176,461	June 16	5	5	Do. 5 p.c. Deb. (Irred.)...	90—95	...
250,000	Nov. 10	6	4	Gas Consolidation Ord. 'B' ...	13/6—14/6	...
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	14/6—16/6	...
19,122,910	July 29 '40	3⅜	4½	Gas Light & Coke Ord. ...	13/3--14/3	−6
2,600,000	,,	3½	3½	Do. 3½ p.c. max.	45—50	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	65—70	...
2,993,000	July 8 '40	3⅜	3⅜	Do. 3⅜ p.c. Red. Pref. ...	67—72	...
8,602,497	Dec. 1	3	3	Do. 3 p.c. Con. Deb. ...	73—78	...
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—105	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	100—103	...
700,000	Sept. 8	3½	3½	Do. 3½ Red. Deb. ...	79—84	...
5,600,000	May 13 '40	4	8	Imperial Continental Cap. ...	58—63	+1
43,820	July 28	3½	3½	Do. 3½ p.c. Red. Deb. ...	80—88	...
231,978	Aug. 25	5	5	M.S. Utility 'C' Cons.	68—73	...
918,657	,,	4	4	4 p.c. Cons. Pref.	73—78	...
675,000	Nov. 10	†4	†4	Montevideo, Ltd.	60—65	+2
300,000	April 28	9	7	Oriental, Ltd.	121—126	...
368,537	July 14	6½	3½	Plymouth & Stonehouse 5 p.c.	65—70	...
621,667	Aug. 18	7½	7½	Portsmouth & Gosport Cons.	88—93	...
648,999	Sept. 8	1/1	1/1½	Severn Val. Gas Cor. Ld. Ord.	15/6—17/6	+6
597,972	,, 8	-/10⅝	-/10⅝	Do. 4½ p.c. Cum. Pref. ...	16/—18/-	...
2,528,714	Aug. 25	1/	7½	South East'n Gas Cn. Ld. Ord.	12/6—14/6	...
1,000,000	,,	-/10⅝	-/10⅝	Do. 4½ p.c. Red. Cum. Pref.	14/6—16/6	...
1,068,869	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	11/6—13/6	...
6,709,895	Aug. 5 '40	4	4	South Met. Ord.	50—55	...
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	75—80	...
850,000	,,	4	4	Do. 4 p.c. Irred. Pref. ...	60—65	...
1,895,445	June 30	3	3	Do. 3 p.c. Perp. Deb. ...	70—75	...
1,000,000	July 14	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
1,543,795	Sept. 8	4	2	South Suburban Ord. 5 p.c ...	61—66	...
512,825	,,	5	5	Do. 5 p.c. Perp. Pref. ...	72—77	...
500,000	,,	4	4	Do. 4 p.c. Perp. Pref. ...	65—70	...
250,000	,,	3¾	3¾	Do. 3¾ p.c. Red. Pref. ...	78—83	...
888,587	,,	5	5	Do. 5 p.c. Perp. Deb. ...	98—103	...
750,541	June 16	5	2	Southampton Ord.	50—55	...
350,000	Aug. 18	5	5	Swansea 5½ p.c. Red. Pref. ...	88—93	...
1,076,495	,,	5	5	Tottenham & District Ord. ...	73—78	+2
338,555	,,	5	5	Do. 5 p.c. Pref.	78—83	...
453,380	June 9	4	4	Do. 4 p.c. Perp. Deb. ...	82—87	+3
1,247,505	Dec. 1	4	‡4	U. Kingdom Gas Cor. Ord. ...	13/—15/-	...
1,085,952	Nov. 17	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	14/—16/-	...
772,709	,,	4	4	Do. 4 p.c. 1st Red. Cum.Pref.	14/6—16/6	...
745,263	June 16	4½	4½	Do. 4½ p.c. 2nd Non.Cum. Pf.	11/—13/-	...
1,200,000	Sept. 22	3½	3½	Do. 3½ p.c. Red. Deb. ...	86—91	...
380,606	Aug. 18	7	6⅔	Uxbridge, &c., 5 p.c.	80—90	...
1,371,138	Sept. 1	4	4	Wandsworth Consolidated ...	70—75	+2
2,525,768	,,	4	4	Do. 4 p.c. Pref.	67—72	...
1,343,964	June 16	5	5	Do. 5 p.c. Deb.	100—105	...
283,745	,,	4	4	Do. 4 p.c. Deb.	80—85	...
588,342	Aug. 25	5	5	Watford & St. Albans Ord. ...	85—90	...
300,000	June 9	3½	3½	Do. 3½ p.c. Red. Deb. ...	84—89	...

SUPPLEMENTARY LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 4.	Rise or Fall on week
351,685	June 16	5	5	Brighton, &c., 5 p.c. Perp. Deb.	88—93	...
28,700	,,	5½	5½	Do. 5½ p.c. Red. Deb. 1942 ...	95—100	...
415,250	,,	4	4	Bristol Gas Co., 4 p.c. New Deb.	87—92	...
140,205	Aug. 5	7	7	Cambridge, &c., 7 p.c. Cons. 'B'	105—110	+5
295,932	Aug. 18	5	5	Cheltenham, 5 p.c. Cons.Ord....	85—90	...
42,500	June 16	4	4	Do. 4 p.c. Perp. Deb....	75—80	...
150,000	Aug. 11	4	4	Croydon Gas, 4 p.c. Pref. (Irr.)	68—73	...
130,000	June 30	4	4	Do. 4 p.c. Deb. ...	80—85	+8
146,700	Aug. 18	5½	5½	East Surrey, 5½ p.c. Pref. 'A' ...	85—90	...
53,220	,, 10	6	6	Do. 6 p.c. Cum. Pref. ...	90—100	...
...	Aug. 19 '40	6	4	Eastbourne, 'B' 3½ p.c....	35—40	...
239,135	Nov. 17	5	5	Gas Consolidation 'A' Ord. (£1)	11/6—13/6	...
156,600	Aug. 18	5	5	Hampton C't, 5 p.c. Cons. Ord.	75—80	+6
18,000	June 30	3½	5½	Malta & Med'n., 7 p.c. 1st Pref.	50—60	...
10,845	,, 30	3½	3½	Do. 7½ p.c. 2nd Pref.	40—50	...
50,000	Aug. 25	£5 19 6	£5 4 6	Mid. South. Util., 'A' Cons. 5 p.c.	60—70*	...
65,000	Aug. 18	5	5	North Middlesex, 5 p.c. Pref....	75—80	...
70,000	Sept. 8	5	5	Plymouth & Stone., 5 p.c. Deb.	83—88	...
76,501	June 30	4	4	Reading, 4 p.c. Perp. Deb. ...	70—75	...
74,777	Sept. 30	4	4	Romford, 4 p.c. Debs. (Reg.) ...	77—82	...
21,000	June 9	5	5	Slough, 5 p.c. Perp. Deb. ...	87—92	...
211,740	,, 16	5	5	Southampton, 5 p.c. Red. Deb.	95—100	...
363,575	July 1	5	5	Tottenham, 5 p.c. Reg. Red. Mt.	97—102	...
202,019	—	—	—	Tunbridge Wells, 4 p.c. Scale ...	90—100	...
135,257	June 9	5	5	Uxbridge &c., 5 p.c. Perp. Deb.	97—102	...

PROVINCIAL EXCHANGES

					Quotations Dec. 4.	
804,948	July 28	5	5	Bath Cons.	93—97	...
122,577	July 28	6	6	Blyth 5 p.c. Ord.	100—105	...
1,667,250	July 21	5	5	Bristol, 5 p.c. max.	95—97	−⅜
120,420	June 16	4	4	Do. 1st 4 p.c. Deb.	99—101	+1½
415,250	,,	4	4	Do. 2nd 4 p.c. Deb. ...	97—99	+1½
328,790	,,	5	5	Do. 5 p.c. Deb.	110¼—113½	...
157,150	Aug. 5	6½	5	Chester 5 p.c. Ord.	96½—99¼	...
92,500	June 16	4	4	Do. 4 p.c. Pref.	78—80	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	78½—83½	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	92—96	...
542,270	Aug. 11	9	6	Derby Cons.	98—103	...
55,000	Dec. 16	4	4	Do. 4 p.c. Deb.	75—80	...
10,000	Aug. 11	10	10	Great Grimsby 'A' Ord. ...	155—165	...
6,500	,,	10	10	Do. 'B' Ord. ...	155—165	...
79,000	,,	10	10	Do. 'C' Ord. ...	145—155	...
732,000	Aug. 25	4	4	Hartlepool G. & W. Cn. & New	61—63	...
2,167,410	Aug 18	6	6	Liverpool 5 p.c. Ord.	97—99	+½
245,500	June 16	5	5	Do. 5 p.c. Red. Pref. ...	96½—99½	...
306,083	July 15	4	4	Do. 4 p.c. Deb.	94—99	...
20,000	June 23	5	5	Long Eaton 5 p.c. Pref. ...	9—11	...
80,000	,,	5	5	Do. 5 p.c. Deb.	87—92	...
2,430,267	July 28	5½	5	Newcastle and Gateshead Con.	18/3—18,9a	+6
682,856	,,	4	4	Do. 4 p.c. Pref.	83½—84½	+½
776,706	June 30	3½	3½	Do. 3½ p.c. Deb.	83—84	+½
277,285	Nov. 3	5	5	Do. 5 p.c. Deb. '43 ...	99—101	...
274,000	March 17	5	5	Newport (Mon.) Ord.	86—89	...
13,200	Sept. 16	8‡	7	Pontyp'l Gas & W. 10 p.c. 'A'	11½—12½	...
13,600	,,	6	5	Do. 7 p.c. 'B'	9½—10½	...
40,000	,,	5	6	Do. 7 p.c. 'C'	9½—10½	...
106,280	Aug. 11	10	10	Preston 'A' 10 p.c.	155—165	...
188,219	,,	7	7	Do. 'B' 7 p.c.	113—123	...
1,806,339	Aug. 25	6½	6½	Sheffield Cons.	120—125	+3½
95,000	July 7	4	4	Do. 4 p.c. Deb.	96—99	...
332,351	Sept. 8	6	6	Sunderland 6 p.c. max. ...	107—110	...
192,150	Aug. 11	5	5	Weston-super-Mare Cons. ...	80—85	...
64,338	June 30	4	4	Do. 4 p.c. Deb.	80—85	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	135—140	...

a—The quotation is per £1 of Stock. * Ex. div. † Paid free of income-tax. ‡ For year.

En passant

I had rather have a fool to make me merry
than experience to make me sad.

Shakespeare (As You Like It).

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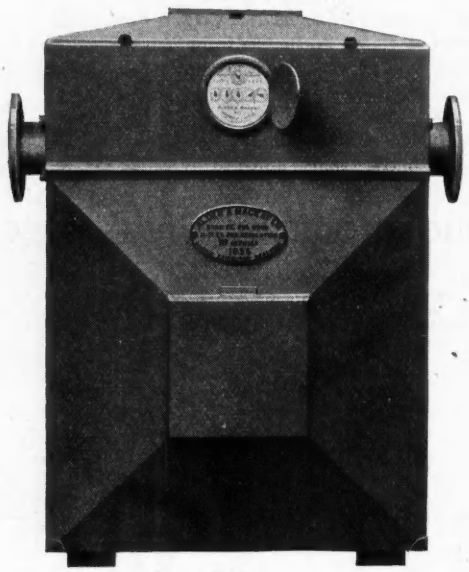

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